CLAIMS

What is Claimed is:

1. An embedded microelectronic capacitor incorporating ground shielding layers comprising:

an upper ground shielding layer having an aperture therethrough;

an electrode plate positioned spaced-apart from said upper ground shielding layer having a via extending upwardly away from said electrode plate through said aperture in said upper ground shielding layer providing electrical communication to said electrode plate without shorting to said upper ground shielding layer;

a middle ground shielding layer positioned in the same plane of said electrode plate and surrounding while spaced-apart from said electrode plate at a predetermined distance; and

a dielectric material embedding said upper ground shielding layer and said middle ground shielding layer.

2. An embedded microelectronic capacitor incorporating ground shielding layers according to claim 1, further comprising a lower ground shielding layer positioned spaced-apart from said electrode plate in an opposing relationship to said upper ground shielding layer.

3. An embedded microelectronic capacitor incorporating ground shielding layers according to claim 1, wherein said middle ground shielding layer is electrically connected to said upper ground shielding layer by at least one via.

4. An embedded microelectronic capacitor incorporating ground shielding layers according to claim 1, wherein said upper ground shielding layer, said electrode plate and said middle ground shielding layer are fabricated of an electrically conductive metal.

5. An embedded microelectronic capacitor incorporating ground shielding layers according to claim 2, wherein said upper ground shielding layer, said electrode plate, said middle ground shielding layer and said lower ground shielding layer are fabricated of Cu or Al.

6. An embedded microelectronic capacitor incorporating ground shielding layers according to claim 1, wherein said via is formed of a low electrical resistance metal.

7. An embedded microelectronic capacitor incorporating ground shielding layers according to claim 2, wherein said upper ground shielding layer, said electrode plate, said middle ground shielding layer and said lower ground shielding layer each having a thickness between about 0.01 mm and about 0.1 mm.

8. An embedded microelectronic capacitor incorporating ground shielding layers according to claim 1, wherein said upper ground shielding layer and said electrode plate are embedded parallel to each other at a distance between about 0.05 mm and about 0.5 mm, respectively.

9. A method for fabricating an embedded microelectronic capacitor with ground shielding layers comprising the steps of:

providing a core dielectric layer;

patterning and forming a first plurality of via holes in said core dielectric layer;

depositing an electrode plate layer on a top surface of said core dielectric layer filling said first plurality of via holes and forming a first plurality of vias, a plurality of electrode plates and a middle ground shielding layer for each of the plurality of electrode plates and for connecting to each of the plurality of vias;

depositing a fourth metal layer on a bottom surface of the core dielectric layer;

laminating a first dielectric layer onto the top surface of the core dielectric layer and forming a second plurality of via holes therethrough, each communicating with one of the plurality of electrode plates and the middle ground shielding layer; and

laminating a second dielectric layer onto the bottom surface of the core dielectric layer.

10. A method for fabricating an embedded microelectronic capacitor according to claim 9, further comprising the step of depositing said electrode plate layer in an electrically conductive metal.

11. A method for fabricating an embedded microelectronic capacitor according to claim 9, further comprising the step of depositing said electrode plate layer in Cu or Al.

12. A method for fabricating an embedded microelectronic capacitor according to claim 9, further comprising the step of forming said plurality of vias in a low electrical resistance metal.

13. A method for fabricating an embedded microelectronic capacitor according to claim 9, further comprising the step of depositing said electrode plate layer to a thickness between about 0.01 mm and about 0.1 mm.

14. A method for fabricating an embedded microelectronic capacitor according to claim 9, further comprising the step of forming said plurality of electrode plates at a distance between about 0.05 mm and about 0.5 mm from said fourth metal layer.

15. An embedded microelectronic capacitor incorporating ground shielding layers comprising:

an upper electrode plate having a via extending upwardly away from said plate and an aperture therethrough;

an upper ground shielding layer positioned in the same plane of said upper electrode plate, surrounding while spaced-apart from said upper electrode plate at a pre-determined distance;

a middle electrode plate positioned spaced-apart from said upper electrode plate having a via extending upwardly away from said middle electrode plate through said aperture in said upper electrode plate providing electrical communication to said middle electrode plate without shorting to said upper electrode plate;

a middle ground shielding layer positioned in the same plane of said middle electrode plate, surrounding while spaced-apart from said middle electrode plate at a predetermined distance;

a lower ground shielding layer positioned spaced-apart from said electrode plate in an opposing relationship to said upper ground shielding layer; and

a dielectric material embedding said upper ground shielding layer, said middle ground shielding layer and said lower ground shielding layer.

16. An embedded microelectronic capacitor incorporating ground shielding layers according to claim 15, wherein said pre-determined distance between said middle ground shielding layer and said middle electrode plate and between said upper ground shielding layer and said upper electrode plate is at least 0.2 mm.

17. An embedded microelectronic capacitor incorporating ground shielding layers according to claim 15, wherein said middle ground shielding layer is electrically connected to said upper and said lower ground shielding layers by at least one via.

18. An embedded microelectronic capacitor incorporating ground shielding layers according to claim 15, wherein said upper ground shielding layer, said middle ground shielding layer and said lower ground shielding layer are fabricated of an electrically conductive metal.

19. An embedded microelectronic capacitor incorporating ground shielding layers according to claim 15, wherein said dielectric material comprises a low dielectric constant material or a high dielectric constant material.

20. An embedded microelectronic capacitor incorporating ground shielding layers according to claim 15, wherein said upper ground shielding layer, said middle ground shielding layer and said lower ground shielding layer are embedded parallel to each other at a distance between about 0.05 mm and about 0.5 mm, respectively.